

## **REMARKS**

Applicants have fully considered the non-final Office Action of August 26, 2005. Claims 13 and 32 have been cancelled. Claims 2-4, 6, 14-18, and 21-31 remain pending. Applicants request reconsideration of the application.

Claims 2-4, 13-16, and 21-27 were rejected under 35 USC 102(b) as anticipated by, or in the alternative under 35 USC 103(a) as obvious over Sato et al. Applicants traverse the rejections.

Sato does not anticipate the instant claims. Applicants appreciate the Examiner's clear statement that the last structure on page 986 anticipates. However, this structure does not meet all claim limitations. Specifically, it does not meet the limitation that the weight average molecular weight ( $M_w$ ) is from about 4,000 to about 500,000. As Applicants have previously stated, Sato teaches oligomers, not polymers, and it is known that oligomers and polymers exhibit different properties.

One difference in properties is in the distribution of molecular weights. The number average molecular weight ( $M_n$ ) is the total weight of all the polymer molecules in a sample divided by the total number of polymer molecules in a sample. The weight average molecular weight ( $M_w$ ) is the weighted average of all the polymer molecules in a sample. In the case of an oligomer like Sato's structure,  $M_n$  is equal to  $M_w$  because all of the molecules have the same weight. However, in a polymer, the distribution of molecular weights will vary because not all of the polymer molecules will have the same weight.  $M_w$  measures this variance. In Sato, the last structure has a  $M_w$  of only 2,000. That  $M_w$  does not fall within the range of the claimed  $M_w$ , about 4,000 to about 500,000. In fact, it is inherently impossible for Sato's oligomer to attain a  $M_w$  of about 4,000. Therefore, Sato does not anticipate.

Sato does not render obvious the instant claims. As discussed, Sato does not teach all claim limitations. MPEP § 2143.03. In addition, Sato does not give motivation to make the polythiophenes of the instant claims because he provides no motivation to increase the  $M_w$ . Sato also teaches away from producing a polythiophene having a conductivity of about  $10^{-6}$  to about  $10^{-9}$  S/cm. On page 985, Sato notes the interest in  $\pi$ -conjugated polymers because of their high electrical conductivities and notes a study

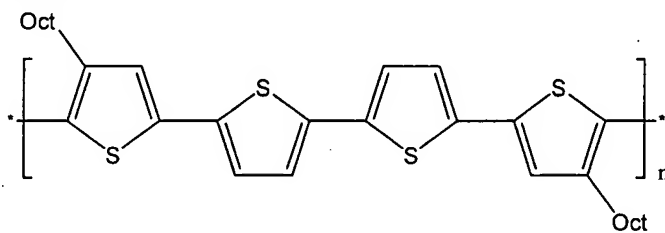
of poly[3-(long alkyl)thiophenes] having conductivities from 10 to 95 S/cm. Such conductivities are orders of magnitude larger than those of the instant claims and would not suggest the polythiophenes of the instant claims. See MPEP § 2145(X)(D).

Applicants also note that Sato's oligomer uses one specific repeating unit. This repeating unit does not match any of the repeating units of the specific polythiophenes claimed in claims 3 and 4. Therefore, these polythiophenes cannot be rendered obvious by Sato.

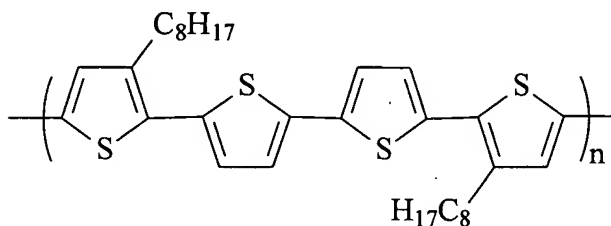
For these reasons, Applicants request withdrawal of the 102(b)/103(a) rejections based on Sato.

Claims 2-4, 6, 13-16, 18, and 21-27 were rejected under 35 USC 102(b) as anticipated by, or in the alternative under 35 USC 103(a) as obvious over van Hutten et al. Applicants traverse the rejections.

van Hutten does not anticipate. The Examiner states that next to the last formula on page 3219, the formula corresponds to the general formula of claim 2 or formula (II-c) in claims 3-4. Applicants believe the Examiner is referring to the polymer labeled p-T<sub>4</sub>Oct<sub>2</sub> having the chemical structure:



For comparison, the claimed polythiophene of formula (II-c) is shown below:



As the Examiner can clearly see, the two polythiophenes do not have the same chemical structure. Similarly, van Hutten does not anticipate the general formula of claim 2 because the general formula has a specific stereochemistry that is different from van Hutten. Therefore, van Hutten does not anticipate.

van Hutten does not render the instant claims obvious. As stated in prior responses, van Hutten is directed to approaches for controlling the luminescence wavelength and does not teach or suggest polythiophenes having the claimed conductivities. Therefore, it does not teach all claim limitations. MPEP § 2143.01. In addition, van Hutten teaches away from substituted regular thiophene polymers. He discloses that substituted polythiophenes are strongly red-shifted and do not exhibit desired properties or control of the luminescence properties. He also teaches that interrupting the  $\pi$ -conjugation of a thiophene polymer by introducing silicon atoms between thiophene rings is desirable, while merely adding substituents to a regular thiophene chain actually increases the size of the  $\pi$ -system. Taken as a whole, van Hutten teaches away from the claimed polythiophenes. MPEP § 2145(X)(D).

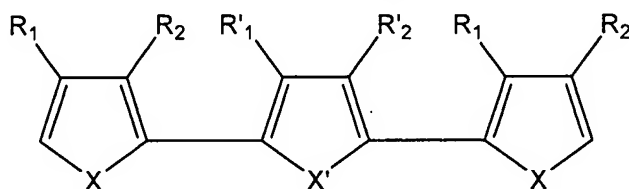
The Examiner has never responded to these arguments. The only comment in the new Office Action is that because the prior art polymers are prepared using similar process conditions, the claimed polythiophenes could be prepared following the teachings of the reference. This ignores the clear requirement that there must be a teaching or suggestion to produce the claimed polythiophenes. MPEP § 2143.01. The fact that the references can be modified is not sufficient to render the claimed polythiophenes obvious unless they also suggest the desirability of the modification. *In re Mills*. The fact that the claimed polythiophenes are within the capabilities of one of ordinary skill in the art is also not sufficient to render the claimed polythiophenes obvious unless they also suggest the desirability of the modification. *Ex parte Levengood*. The Examiner still has not pointed to a reference which motivates one of ordinary skill in the art to make the claimed polythiophenes.

For these reasons, Applicants request withdrawal of the 102(b)/103(a) rejections based on van Hutten.

Claims 28, 31, and 32 were rejected under 35 USC 103(a) as obvious over EP 0402269 in view of Sato or van Hutten. Applicants traverse the rejection.

The combination of references does not meet all claim limitations. MPEP § 2143.03. Specifically, the claimed polythiophene formula is not disclosed in any of the three references. As explained above, Sato and van Hutten do not disclose the claimed

formula or render it obvious. The Examiner states that EP 0402269 discloses the claimed formula on page 5. Applicants believe the Examiner is referring to the last polythiophene on the page, which has the chemical structure:



This structure does not disclose the claimed formula because R<sub>1</sub> and R<sub>2</sub> on the two outer polythiophenes do not have the same stereochemistry as in the claimed formula. As noted above, because there is no teaching as to the desirability of the claimed formula, the instant claims are obvious over EP 0402269 in view of Sato or van Hutten.

For this reason, Applicants request withdrawal of the 103(a) rejection based on EP 0402269 in view of Sato or van Hutten.

Claim 29 was rejected under 35 USC 103(a) as obvious over Sato or van Hutten. Applicants traverse the rejection.

Claim 29 depends from claim 28. As explained above, claim 28 is non-obvious. Any claim depending from a non-obvious claim is also non-obvious. MPEP § 2143.03; *In re Fine*. Therefore, claim 29 is non-obvious as well. Applicants request withdrawal of the 103(a) rejection based on Sato or van Hutten.

Claim 17 was rejected under 35 USC 103(a) as obvious over Sato or van Hutten. Applicants traverse the rejection.

The Examiner's reasoning behind this rejection is incorrect. The Examiner states, "the references do disclose the side chain R as trimethylsilyl or alkyl, having the same functionality [as] perfluoroalkyl group, in that none of the side groups contribute or effect mechanism, due to form the same or similar products." However, this statement is incorrect. Trimethylsilyl, alkyl, and perfluoroalkyl differ markedly in their effect on the polythiophenes in properties such as solubility, hydrophobicity, thermal stability, rigidity, reactivity, and crosslinking. These properties affect the consequent electrical properties of the polythiophenes. In addition, while R=alkyl is disclosed in the references,

Applicants are unable to find R=trimethylsilyl in either reference. The closest is van Hutten, which discloses silanes in the backbone, not as a side chain.

In addition, claim 17 depends from claim 2. As previously noted, claim 2 is not obvious over Sato or van Hutten. Any claim depending from a non-obvious claim is also non-obvious. MPEP § 2143.03; *In re Fine*. Therefore, claim 17 is non-obvious as well.

For these reasons, Applicants request withdrawal of the 103(a) rejection based on Sato or van Hutten.

### **CONCLUSION**

For the reasons detailed above, it is submitted all claims remaining in the application (Claims 2-4, 6, 14-18, and 21-31) are now in condition for allowance. Applicants request that the rejections of the claims be withdrawn and that a Notice of Allowance be issued.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he is hereby authorized to call Richard M. Klein, at telephone number 216-861-5582, Cleveland, OH.

It is believed that no fee is due in conjunction with this response. If, however, it is determined that fees are due, authorization is hereby given for deduction of those fees, other than the issue fees, from Deposit Account No. 24-0037.

Respectfully submitted,

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& McKEE, LLP

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